

An Optimized Design for the NSLS 53-MHz RF Cavities and the Ancillary Components

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Abstract

The rf cavities are among the most complex components of a particle accelerator. They perform optimally when all electrical, mechanical, and vacuum requirements are fully integrated. This paper focuses on the mechanical design features of the new 53-MHz room-temperature rf cavities (including their ancillary components) for the X-ray ring at the National Synchrotron Light Source (NSLS). Differences between the new and previous designs of the rf cavities, input couplers, higher-order-mode (HOM) dampers, cooling and vacuum systems are reviewed. Thus far, two out of four units have already been constructed, tested, and installed into the X-ray ring, and two additional rf cavities are planned. The incorporated features in the new design have already demonstrated superior performance over the original design. The operating performance results along with some of manufacturing challenges will be presented.

Keywords: rf cavity, tuner, coupler

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